

# [Multiple Light-Source Illuminating System]

## Abstract

A method and apparatus comprising a multiple light-source illuminating device, the design and construction of which is derived from the lighting requirements of the specific application back up to electroluminescent light source. The resulting illuminating device (16) provides illumination according to the principles of correct lighting practice for the optimal performance of visual tasks in the most efficient, cost effective manner. Coupling with sensors (21) and logical control (20) allows illumination intensity and spectrum to be varied according to changing user needs. The integrated device incorporates ancillary electronic circuits for power, detection and control that best take advantage of the small size, compact beam spread, low operating voltage and long lifetime of solid state electroluminescent light sources and constitutes a complete lighting fixture design. The lighting fixture is comprised of multiple discrete light emitting components of different spatial intensity distribution and color spectrum mounted in specific orientations such that the application oriented com-

bined lighting effect is created. The control is provided via a differentiated power supply (19) capable of affecting the current, voltage and duty cycle determining the relative contribution of each light source effecting a different spatial intensity distribution and color spectrum. Aspects of the invention include: lighting fixtures which adapt to ambient lighting, movement, visual tasks being performed, perform self-calibration feature to compensate for LED aging; lighting fixtures having spatial distribution of spectrum and intensity, providing both "background" room lighting, and "task" lighting, said spatial distribution of spectrum and intensity, further including positional dependence of spectrum vs. intensity and a specified design range of spectrum vs. intensity. A number of specific designs based on these capabilities are presented.